The Photo-Pneumatic CO2 Analyzer, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

We are proposing to build a new technology, the photo-pneumatic analyzer. It is small, solid-state, inexpensive, and appropriate for observations of atmospheric carbon dioxide (CO2) from six of the seven robotic platforms being targeted by NASA in its solicitation. An inexpensive MEMS transducer is integrated into a miniature pair of gas cells to serve as the radiation sensitive element of the analyzer. Absorption by individual vibration-rotation transitions serves as the measure of CO2 Dry Mole Fraction of the sample. The analyzer has significant sensitivity, bandwidth and specificity to 12CO2 or 13CO2. Target sensitivity is 0.1 ppmv at 1 Hz for both isotopes. The analyzer may be modified to detect additional molecular species. The immediate objective is to develop an expendable CO2 analyzer that can be manufactured by machine and can be used to validate observations of CO2 column from spacecraft and can further serve as the basis of a new global monitoring network of climate change. The products targeted for Phase II are: (i) a substantial series of vertical profiles of CO2 that serve to prove the utility of the new technology as payload of the expendable balloon platform and (ii) the manufacturing plan for a commercially viable photo-pneumatic analyzer.

Primary U.S. Work Locations and Key Partners

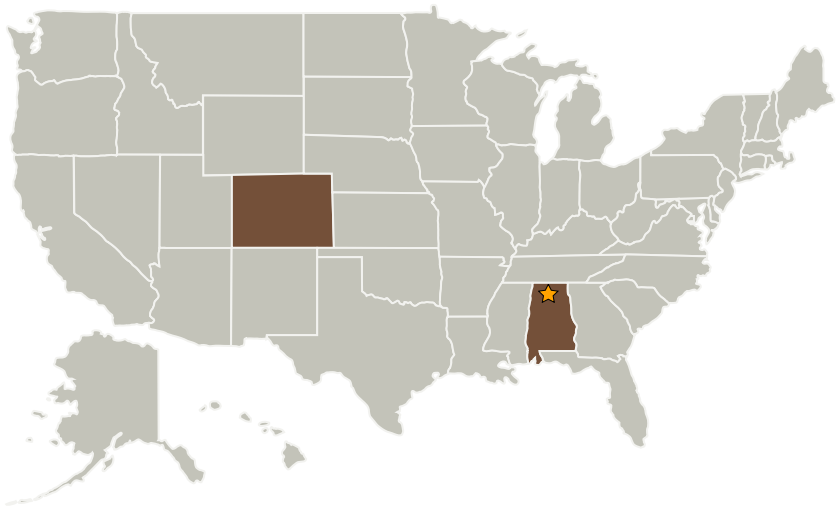

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Atmospheric Observing Systems, Inc.	Supporting Organization	Industry	Boulder, Colorado

Primary U.S. Work Locations	
Alabama	Colorado

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.6 Extreme Environments Related to Critical System Health Management